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REPORT ON 1980 PROPERTY LOSS COMPARISON FIRES

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AN INSURANCE INDUSTRY ASSESSMENT OF THE IMPACT OF RESIDENTIAL SPRINKLERS ON FIRE LOSS

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federal emergency management agency
U.S. fire administration

Los Angeles test site: actual location, 111 Palace Street, Playa Del Ray, CA

U.S. Fire Administration (USFA): sponsor for ongoing investigation into ways to cut fire deaths and reduce fire injuries

National Fire Protection Association (NFPA): prime contractor for USFA grant to field test a residential sprinkler system

Factory Mutual System (FM): subcontractor to NFPA with responsibility to provide test site instrumentation and to analyze and evaluate data resulting from the 60 (approx.) fire tests

Los Angeles Fire Department (LAFD): provided L.A. test site management including consulting services and manpower.

Ad Hoc Committee: the insurance industry group responsible for this report.

Any opinions, findings, conclusions or recommendations expressed in this publication do not necessarily reflect the views of the Federal Emergency Management Agency or the U.S. Fire Administration.

November, 1980

REPORT ON 1980 PROPERTY LOSS COMPARISON FIRES

AN INSURANCE INDUSTRY ASSESSMENT OF THE IMPACT OF RESIDENTIAL SPRINKLERS ON FIRE LOSS

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published by

Ad Hoc Insurance Committee on Residential Sprinklers

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PAGE

TABLE OF CONTENTS

1. Acknowledgements
2. Foreword
3. Background
4. Formation of the Ad Hoc Committee on Residential Sprinklers
4. Need For a New Standard
5. Ad Hoc Insurance Industry Committee Membership List
6. Mission of the Ad Hoc Committee
6. Committee Observations
6. Recommendation
7. Fire Department Notification
8. Factors Tending To Affect Damage in Comparison Fire Tests
9. Special Considerations For Sprinklered Dwellings
11. Claim Payment Estimates
12. Claim Payment Expense
13. Livingroom Narrative
14. Livingroom Claim Payment Expense Chart
15. Bedroom Narrative
16. Bedroom Claim Payment Expense Chart
17. Kitchen Narrative
18. Kitchen Claim Payment Expense Chart
19. APPENDIX
20. Hardware Reliability
22. Comments From Harry Shaw, U.S. Fire Administration

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ACKNOWLEDGEMENTS

It is appropriate to mention that the sprinklered, non-sprinklered comparison fires would not have been possible except for the willingness of the U.S. Fire Administration to extend operation of the L.A. test site. Also the speed with which the property insurance trade associations made appointments to the ad hoc committee reflected their understanding of the unique opportunity to get information and the nearness of the date when both the test site and the USFA test team would be dismantled.

Damage estimating services for the project were supplied by Allstate Insurance Company, Firemen's Fund Insurance Company, GAB Business Services, Inc., GEICO, INA, the Insurance Services Office, the Kemper Group and State Farm Insurance Company.

It should also be acknowledged that the Allstate Foundation made a $10,000 grant to NFPA that enabled the test team to furnish the test site with clothing, appliances and other items that were not part of the originally planned sprinkler tests.

At the very start of the Los Angeles sprinkler tests, significant contributions were made by Grinnell Fire Protection Systems and the Copper Development Association (CDA). Grinnell contributed the engineering design work and CDA funded the materials and the installation of the test site sprinkler system designed by Grinnell.

The test site house and the adjacent headquarters building were made available, without charge, by the Los Angeles Airport Authority.

FOREWORD

This report has been prepared for use by insurance companies, insurance trade associations and related service industries in considering the impact of residential sprinklers on fire loss in dwelling properties. Had more time, funds and manpower been available, a greater number and variety of comparison tests would have been desireable. That the tests reported here did take place is an example of how federal and local governments and private industry can cooperatively take advantage of a unique, short-lived opportunity to develop beneficial information.

It is likely that the greatest benefit of residential sprinklers will be the lives saved and the injuries prevented. The focus of the ad hoc committee and this report, however, is on the single factor of property loss reduction.

This report is based on the matched-pairs of fires designed to meet the mission of the ad hoc committee. These fires were a small part of the test series. Those interested in the procedures, results and conclusions concerning the performance of residential sprinklers will want to obtain a copy of the report on the entire series.

BACKGROUND

During 1979 USFA sponsored over 60 tests to investigate the benefits of residential sprinklers. A key group advising USFA was the Residential and Light Hazard Sprinkler Subcommittee (13D) of the NFPA. It became a matter of concern that subcommittee discussions in two areas were vulnerable to serious misunderstanding:

1. the USFA estimate that residential property losses would be reduced 60 to 80 percent by sprinklers

2. the assumption that substantial insurance incentives would follow without question

Without speaking to the accuracy, or possible inaccuracy of the above items, 13D members were advised that public discussion of these items could lead to problems because:

a. there would inevitably be a media misunderstanding resulting in a statement about a 60 to 80 percent insurance saving

b. even those people aware of the multi-peril nature of a homeowners policy are not likely to know that the fire and lightning (F&L) portion of their policy may account for only 35 to 40 percent of the total homeowner premium

c. few people understand that claim expenses for a fire loss include smoke damage, water damage, additional living expenses, fixed claim expenses and a number of other items in addition to direct fire damage

Insurance companies prefer to develop rates based on experience with a large number of risks.

Lacking a large body of real world experience, a closely controlled set of comparison tests might give insurance companies something on which to base underwriting judgement regarding whether a discount was indicated. Such tests might also give some guidance on the size of any such discount.

FORMATION OF THE AD HOC COMMITTEE ON RESIDENTIAL SPRINKLERS

At the request of USFA, an ad hoc insurance committee was created to design, oversee and help conduct matched fire tests, with and without sprinklers. The committee was created with the assistance of the Alliance of American Insurers, the American Insurance Association and the National Association of Independent Insurers. Each trade association provided several committee members from their client companies and a member from their staff. Also, at their suggestion, members were added from the Insurance Services Office, Schirmer Engineering Corp., Tech Cor and GAB Business Services.

NEED FOR A NEW STANDARD

Since the existing NFPA standard on residential sprinklers (13D) was approved in 1975, no significant number of residential sprinkler installations has been made. It is the concensus of those concerned with the problem that the expense of meeting that standard was a major problem.

The sprinkler system installed at the L.A. test site meets a proposed new standard scheduled for consideration and approval at the NFPA November, 1980 Conference. Anyone wishing to review the 1975 13D or the proposed 1980 Standard may order a copy from:

National Fire Protection Association
470 Atlantic Avenue
Boston, MA 02210
617 + 482-8755

Since 1977, the Insurance Services Office (ISO) has had filings in many states providing a 5 (five) percent discount on a homeowner policy covering a dwelling with an approved and properly maintained sprinkler system that covers all areas of the insured structure. Their filings also allow a 2 (two) percent discount for a similar system that omits specified areas such as closets, attics and bathrooms.

There is considerable interest in the establishment of larger discounts, particularly as an incentive to sprinkler installation. While a significant discount would no doubt serve as an incentive, rate reductions need to be justified in terms of lowered risk. Before such a move can be reasonably considered, it is necessary that a standard exist for reference in filings.

AD HOC INSURANCE INDUSTRY COMMITTEE ON RESIDENTIAL SPRINKLERS

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Ralph J. Jackson, Chairman
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Allstate Plaza F-3
Northbrook, IL 60062
312/291-5089

MISSION OF THE AD HOC COMMITTEE

— to cooperate with the U.S. Fire Administration and its test team to design and conduct a limited number of matched-fire tests to investigate the property loss reduction potential of residential sprinklers installed in accordance with the standards used at the Los Angeles test site

— to make the results of the comparison tests available to the insurance industry and other interested parties

Committee Observations

Based on the results of the comparison tests it was the observation of the ad hoc committee that sprinkler systems installed according to the standard used in the Los Angeles comparison tests definitely have the ability to reduce claim payment expenses. The committee further noted that the early ISO discount (1977) is less than what seems to be indicated by the 1980 tests.

Recommendation

That those corporate and association people with rate making responsibilities review this information with the intention of making their own determinations of what discount might be indicated by sprinkler systems installed to the specifications used at the Los Angeles test site.

FIRE DEPARTMENT NOTIFICATION

In order to achieve a near normal fire department response, the suppression personnel were not briefed on the nature or location of the fire within the test house. Their instructions were to treat the test house just as they would treat any call. They were simply to deal with the fire and overhaul according to normal procedures. They were aware, however, that the structure was unoccupied and therefore a search for possible occupants was unnecessary. As a result, fire suppression operations were started immediately upon arrival. Normal shift rotations during the several weeks of the test fires tended to eliminate the factor of firefighter familiarity with the test site.

The notification procedure for unsprinklered fires was: When smoke or flames were first visible enough for notice by pedestrians or passing drivers, there was a five minute wait to simulate gaining access to a phone and reaching the fire department. Two minutes after the notification call the first piece of equipment arrived at the first scene.

In the sprinklered tests, although all evidence of fire was gone by the third minute of each fire, the sprinklers were allowed to operate for ten minutes to simulate notification and response time. The sprinklers were then shut off manually and any necessary overhaul performed. Operating this way also met the ten minute water supply demand required by 13D.

The two minute response time is better than could be expected in most instances. This and other factors that may have affected the extent of fire damage and the amount of water used are mentioned under the heading, "Factors Tending To Affect Damage In Comparison Fire Tests."

RS TENDING TO AFFECT DAMAGE IN COMPARISON FIRE TESTS

Note: While it is not true in every instance, generally, the longer a fire remains undetected, the greater the supression challenge, the greater the damage and the greater the amount of water needed to suppress the fire.

e training, equipment and manpower availability of the Los Angeles Fire Department enabled uppression response such as would be expected from a department that is among the best in e country. Any factor making the suppression response less prompt or less effective could be pected to result in more extensive damage.

e responding companies did know that the structure was unoccupied and were able to attack e fires without delay.

l test fires took place during daytime. This may have contributed to the speed with which the efighters could move about the scene.

l tests took place during good weather. Rain, snow accumulation or below-freezing tempera-ures could have tended to slow movement at the fire scene. This is particularly true of activities n the roof.

n all fires, prompt notification was a factor. Had notification for the sprinkler tests been delayed, reater water damage could have been experienced. Later notification for the non-sprinklered ires would most likely have resulted in more extensive fire damage and an increased amount of vater used in extinguishment.

ate notification for the sprinklered fire, however, would not be expected to result in significantly rent damage unless the period of sprinkler operation extended on the order of thirty minutes or e.

All fires were unventilated prior to suppression team arrival. This probably tended to be a factor in the fires, e.g., bedroom tests, where a great amount of smoke was generated.

SPECIAL CONSIDERATIONS FOR SPRINKLERED DWELLINGS

1. All sprinklered fires in the comparison tests took place in rooms having sprinklers. Greater damage would have been expected if the fire took place in an unsprinklered area such as a closet, attic or storage room.

2. Good weather eliminated the possibility that any of the sprinklers would fail to operate because of freezing.

3. The sprinkler system was recently installed and well maintained. In the real world, industrial experience indicates that a percentage of malfunctions must be expected due to closed valves and inadequate maintenance. It is likely that inspection and maintenance on residential sprinklers will occur with less frequency than industrial installations. This, too, could be a factor.

   If there is a single water service from the street, however, it would not be possible to shut down the sprinkler system without also cutting off the regular residential water supply.

4. The sprinkler activations reported here were all the result of fires. In considering the long term use of sprinklers, malicious activation and leakage caused by freezing must all be taken into account. The industrial sprinkler experience has been very favorable with regard to accidental activation. This may provide some guidance.

OTHER FACTORS

The house was furnished with less furniture than might be expected for its size. The quality of the furnishings was on the low side. Because the set-ups were the same for all fires, this was not considered to be a significant factor.

The furniture used in the comparison tests was of the sort currently available in most parts of the country. Had the furniture met the flammability standards of the State of California, the cigarette fires might have never reached the open flame stage.

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CLAIM PAYMENT ESTIMATES

The Jury

To ensure the acceptability of the claim payment estimates, it was decided that a jury of three experienced claim representatives would serve as a team for each fire event. Most adjusters took part in two fire events; some took part in more than two. A representative of the Insurance Services Office also took part as an observer.

GAB Business Services, Inc. assigned their Los Angeles Regional Office General Adjuster William Orr who served as coordinator and lead adjuster on all the comparison fires. In addition to scheduling the other team members, the coordinator developed a set of data recording forms to aid the team members in following a uniform pattern.

Damaged household items were replaced prior to subsequent fire tests. This was necessary to demonstrate that an item's post-fire condition was not due to exposure in a previous test. For example, following the kitchen (sprinklered) fire, the refrigerator was replaced even though it appeared that simply cleaning it would have restored the pre-fire condition. When it was necessary to replace the refrigerator after the non-sprinkler kitchen fire, there was no question that the damage was all the result of the second fire.

Because of wide regional variations in the cost of ALE (additional living expenses), the committee chose $150 a day for a family of five (two adults, three children including both male and female). The weekly ALE was seven times the daily expense and the monthly amount, 30.4 times the daily expense.

The following companies donated the cooperation of their representatives for service on the adjusting juries that estimated the claim payment expenses for each fire:

Allstate Insurance Company - Frank Wheeler
Firemen's Fund Insurance Company - Denise Dimin
GAB Business Services, Inc. - Wm. Orr (coordinator)
GEICO - Marty Schwebel
INA (2) - Paul Thurston and Jeffery Weiss
Insurance Services Office - Orville Sherman (observer)
The Kemper Group - Keith Vint
State Farm Insurance Company (2) - Larry Sprogins &
Jeffery M. Sprogins

CLAIM PAYMENT EXPENSE

Comparison summary

	Kitchen	Livingroom	Bedroom	Average
non-sprinkler	$35,245	$34,110	$8,650	$26,002
sprinkler	$ 3,364	$ 8,617	$6,250	$ 6,077
ratio*	10½:1	4:1	1½:1	4¼:1

*non-sprinkler damage
sprinkler damage

For ease of review, the following fire scene damage reports have been summarized. Those needing detail or clarification should write to:

Ralph J. Jackson
Allstate Plaza F-3
Northbrook, IL 60062

LIVINGROOM

Sprinklered narrative

A cigarette was placed under a throw pillow on an upholstered couch. There was considerable smoke buildup throughout the room preceeding flame and heat sufficient to activate a sprinkler. One sprinkler opened and extinguished the fire. The water supply specifications in this test, as in all L.A. site fires, called for the first sprinkler to deliver 18 gallons per minutes.

Observers indicated the fire was extinguished before the end of the third minute sprinkler activation. At that point, 54 gallons of water had been released by the sprinkler. The sprinkler was allowed to operate a total of ten minutes and apply a total of 180 gallons (10 x 18) to simulate the five minute notification time and the two minute response period used in all the tests. The sprinkler system was then turned off manually.

Estimated claim payment of $8,617 includes $1,050 of additional living expenses.

Non-sprinklered narrative

As in the sprinklered fire, a cigarette was placed under a throw pillow on an upholstered couch. There was considerable smoke buildup for about an hour. At approximately an hour and twelve minutes a small flame was visible. At that time the flame grew rapidly and in less than ten additional minutes the flames were visible from the street. After a five minute wait to simulate location of a phone and notification of the fire department, the equipment was called in. They made a two minute response and extinguished the fire using 80 gallons of water.

Estimated claim payment of $34,110 includes $9,120 (two months) of additional living expenses.

LIVINGROOM

	SPRINKLER	NON-SPRINKLER
	AMOUNT in dollars	AMOUNT in dollars
Lower level		
study	491	540
bath	352	375
rumpus room	0	0
Mid-level		
living room	2,767	6,947
den	329	333
entry	56	326
diningroom	245	630
kitchen	141	517
breakfast room	53	48
bath	77	77
service (utility) room	69	69
Stairs	118	513
Upper level		
hall area	79	483
bedroom 1	510	3,272
closet 1	67	102
master bath	66	66
bedroom 2	444	2,804
closet 2	36	53
bedroom 3	315	1,692
closet 3	46	53
hall bath	86	86
Exterior	0	2,406
Misc.	1,220	3,973
ALE	1,050	9,120
Total	8,617	34,110
Gallons of water used =	180	80

BEDROOM 2

Sprinklered narrative

A wastebasket of crumpled newspaper placed between the bed and nightstand was ignited with a match. After the paper flame subsided, the mattress smoldered and generated considerable smoke. The mattress finally broke into open flame and activated a sprinkler. This single sprinkler extinguished the fire.

Observers indicated the fire extinguished before the end of the third minute from sprinkler activation. At that point 54 gallons of water had been released by the sprinkler. The sprinkler was allowed to operate a total of ten minutes and apply a total of 180 gallons to simulate the five minute notification time and the two minute response period used in all the tests. The sprinkler system was then turned off manually.

Estimated claim payment of $6,520 included one week of additional living expenses ($1,050).

Non-sprinklered narrative

A wastebasket of crumpled newspaper placed between the bed and the nightstand was ignited with a match. After the paper flame died down, the mattress flamed for a while producing a considerable amount of smoke. Heat and smoke continued to build but lack of ventilation and heavy smoke appeared to limit the amount of flame damage. Lack of flaming also tends to explain the small amount of water needed for suppression. Six and a half gallons of water were used.

Estimated claim payment of $8,650 included two weeks of additional living expenses ($2,100).

BEDROOM 2

	SPRINKLER	NON-SPRINKLER
	AMOUNT in dollars	AMOUNT in dollars
Lower level		
study	0	0
bath	0	0
rumpus room	0	0
Mid-level		
living room	0	80
den	665	0
entry	0	0
diningroom	0	0
kitchen	0	0
breakfast room	0	0
bath	145	0
service (utility) room	152	0
Stairs	183	183
Upper level		
hall area	79	79
bedroom 1	1,089	630
closet 1	102	64
master bath	66	66
bedroom 2	1,969	3,566
closet 2	53	53
bedroom 3	315	315
closet 3	46	46
hall bath	90	90
Exterior	0	533
Misc.	516	845
ALE	1,050	2,100
Total	6,520	8,650
Gallons of water used =	180	6½

KITCHEN

Sprinklered narrative

The source of ignition was an electric coffee maker with the thermal limit switch bypassed. The continuous heating produced smoke and flame. As the plastic body melted, the fire transmitted to the overhead cabinets. The melted, flaming plastic damaged the counter top and some of the flaming puddle ran down the side of the base cabinet and burned a small area of the floor covering. At this point the heat was sufficient to activate a sprinkler. This single sprinkler extinguished the fire.

Observers indicated the fire was extinguished before the end of the third minute from sprinkler activation. At that point, 54 gallons of water had been released by the sprinkler. The sprinkler was allowed to operate a total of ten minutes and apply a total of 180 gallons to simulate the five minute notification time and the two minute response period used in all the tests. The sprinkler system was then turned off manually.

Estimated claim payment was $3,364. No additional living expense was provided as the house could be used after a brief cleanup activity.

Non-sprinklered narrative

The ignition source and fire pattern was identical to the sprinklered kitchen fire except that the fire continued to build considerable flame and smoke. The buildup was rapid and at the point where the smoke could be seen from the street, the fire department was notified after the five minute wait to simulate locating a phone and giving the necessary information. The fire department made a two minute response.

Smoke buildup was so severe by the time the fire department arrived that the fire appeared to be in the upper level of the house. This, plus normal fire suppression precaution in checking the room above the source of the fire contributed to the damage on the upper level.

670 gallons of water were used to suppress this fire.

Estimated claim payment was $35,245 and included two months ($9,120) of additional living expenses.

KITCHEN

	SPRINKLER	NON-SPRINKLER
	AMOUNT in dollars	AMOUNT in dollars
Lower level		
study	0	0
bath	0	0
rumpus room	637	1,031
Mid-level		
living room	50	1,399
den	0	321
entry	incl	357
diningroom	594	2,325
kitchen	1,203	6,167
breakfast room	190	934
bath	0	77
service (utility) room	0	69
Stairs	0	183
Upper level		
hall area	0	155
bedroom 1	0	2,771
closet 1	0	111
master bath	0	66
bedroom 2	0	2,939
closet 2	0	53
bedroom 3	0	1,692
closet 3	0	46
hall bath	0	86
Exterior	0	1,601
Misc.	690	3,742
ALE	none	9,120
Total	3,364	35,245
Gallons of water used =	180	670

APPENDIX

HARDWARE RELIABILITY

Some concern has been expressed regarding the reliability of the proposed hardware, specifically its potential for leakage and accidental activation.

Knowing that high reliability would be a key factor to acceptance, the U.S. Fire Administration let a contract bringing the resources of both Factory Mutual Systems and Underwriters Laboratories to bear on a proposed performance standard. The items listed below were extracted from drafts presented in April of 1980 by FM and UL. While those were early drafts, they indicate the severity of the tests recommended. The few items selected for demonstration are by no means complete and perhaps not among the most significant parts of the proposed performance standards.

(Excerpts from 31 pages & appendix of the draft standard)

5.3 **Leakage** - To verify compliance to paragraph 4.3, at least twenty residential sprinklers are to be individually filled with water and subjected to a slowly rising hydrostatic pressure. The pressure is to be increased to 500 psi (3447 kPa) at a rate not to exceed 300 psi (3068 kPa) per minute and held for one minute. During this phase there shall be no weepage or leakage.

5.4 **Hydrostatic Strength** - If all samples comply with the requirements of paragraph 4.3, each sample is to be further subjected to an increasing hydrostatic pressure up to 70 psi (4826 kPa) at a rate not to exceed 300 psi (2068 kPa) per minute. If during this test leakage becomes evident, the pressure at which it was observed will be recorded. The test is then to be continued up to 700 psi (4826 kPa), if possible, and held for one minute. The sprinkler shall not rupture.

5.5 **30 Day Leakage** - To verify compliance to paragraph 4.5, five previously untested sprinklers are to be installed on a water-filled test line which is to be maintained under a constant pressure of 300 psi (2068 kPa) for 30 days. The samples are to be examined weekly during the test period for evidence of leakage of water at the seal. Following satisfactory completion of this 30 day test period, the samples are to be tested to determine the weep and leak points. The samples are then to be examined for any evidence of distortion or physical damage.

5.6 **Water Hammer** - To verify compliance to paragraph 4.6, five previously untested samples are to be installed on a water filled test line and subjected to changes in pressure from 50 to 500 psi (345 to 3447 kPa) at 60 cycles of pressure change per minute. The test piping is to be filled so that there is water at the sprinkler seat. Observations are to be made for evidence of water hammer, the samples are to be hydrostatic tested to determine that the weep and leak points are in excess of 500 psi (3447 kPa). The samples are then to be examined for any evidence of distortion or physical damage.

5.17 **Vibration**

5.17.1 Compliance to the requirement as stated in paragraph 4.17 shall be determined by subjecting a minimum of four residential sprinklers to a vibration of 0.02 in. (0.5 mm) amplitude at a varying frequency ranging from 10 to 35 Hz for a period of 5 hours. If one or more resonant point(s) can clearly be detected, the sprinklers will be vibrated at such frequency (frequencies) for proportionate periods of the remaining 115 hours of the test. If no resonant frequency is detected, then the sprinklers are to be vibrated at an amplitude of 0.02 in. (0.5 mm) and a frequency of 35 Hz for a period of 115 hours.

5.17.2 For this test the sprinklers are to be attached to a steel mounting plate and the plate bolted to the table of a vibration machine so that the sprinklers are mounted vertically. The test sprinklers are then to be vibrated in the vertical direction.

5.17.3 This test is to be conducted with the sprinklers unpressurized.

5.17.4 For these test, amplitude is defined as the maximum displacement of sinusoidal motion from position of rest to one-half of the total table displacement.

5.17.5 Following the vibration test, the sprinklers shall not weep or leak at or below 500 psi (3447 kPa) and shall operate normally when subjected to the sensitivity test, see paragraph 4.20.

5.18 **Rough Usage**

5.18.1 Compliance to Paragraph 4.18 shall be determined by individually placing one out of every four sprinklers to be tested in a drum containing 20 blocks of wood and tumbled for a period of one minute.

5.18.2 The drum, or any suitable container, should be so designed as to provide a tumbling action.

5.18.3 The blocks shall be 1½ in. (38.1 mm) cubes made of hardwood (i.e. oak, maple, etc.).

5.18.4 Following tumbling, they are to be tested for conformance with the requirements for leakage (see paragraph 4.3). After being tested for leakage, each sprinkler shall be tested for conformance with the requirements for sensitivity (see paragraph 4.20)

The above examples demonstrate that the performance requirements for residential sprinkler components will significantly exceed those of normal household plumbing fixtures and fittings.

Underwriters Laboratories is presently ready to conduct performance tests on residential sprinklers submitted for listing.

RESIDENTIAL SPRINKLER TEST FIRES

Comments from Harry Shaw, U.S. Fire Administration

Technological Advance

The residential sprinklers developed for use in the Los Angeles fire tests represent a major technological breakthrough. The sprinklers were developed by Grinnell Fire Protection Systems and used in the tests by the Los Angeles Fire Department under the sponsorship of the U.S. Fire Administration. Prior to the development and use of these sprinklers the fastest time constant of an approved and listed sprinkler was in the order of 110 seconds at five foot per second gas velocity. The slowest time constant was approximately 300 seconds. The new sprinkler used in the L.A. tests was five to 15 times faster than the sprinklers used in approved residential sprinkler installations meeting the current standard. The improved sensing is considered to be the primary reason for the success of the sprinkler system in the L.A. fire test series.

Another characteristic of the new sprinkler is the improved water distribution pattern. Further distribution pattern improvements are expected. The improved distribution provides adequate cooling and reduces the probable actuation of second and third sprinklers. Such actuation could greatly reduce the effectiveness of the system.

Further Developments

One of the more recent developments for residential sprinklers is the on-off feature. After the Los Angeles tests were concluded an on-off sprinkler* was submitted to the Factory Mutual Research Corporation for evaluation and testing. The performance of this sprinkler, as indicated by the Factory Mutual tests, was encouraging, however, additional tests and evaluation are necessary.

Another development may result from a research and development program with the Battelle Memorial Research Laboratories under the sponsorship of the U.S. Fire Administration. Battelle will investigate the use of Nitinol as a sensing element. Nitinol (a nickel titanium alloy) makes a sensor which will convert heat energy into mechanical energy. The objective of the R&D support is to develop a more effective and reliable sensor actuator for residential sprinkler systems.

* the on-off sprinkler will stop the flow of water when the temperature indicates sprinkler operation is no longer needed. In the event of a re-kindle, the sprinkler would turn on again when the temperature reached the activation level.

Mobile Home Sprinkler Tests

The first test of the North Carolina Mobile Home Sprinkler Program was conducted August 27, 1980 in Charlotte, NC with the help of the Charlotte Fire Department. The tests are under the sponsorship of the U.S. Fire Administration with NFPA as the program manager and McNeary Insurance Consulting Services providing site management. Technical support was provided by the Factory Mutual Research Corporation.

The Los Angeles and Charlotte tests were necessary as support for the proposed 1980 revision of the NFPA 13D Residential Sprinkler Standard scheduled for consideration at the November meeting of NFPA in San Diego, CA.

While the results of the 16 mobile home test fires are still being analyzed, the reaction of the test team was that the sprinkler system met and exceeded their life-safety expectations. Since all 16 sprinklered fires took place in the same mobile home unit, the team felt this gave strong indication of the property loss reduction potential of sprinklers. According to the test team, sprinkler activation limited the mobile home property damage to furniture, drapes and moderate scorching in the area of origin.

A full report on the Charlotte tests will be available later through the U.S. Fire Administration.

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